REMARKS

Claims 1-26 are active in the present application. Claims 13-26 are drawn to elected subject matter and find support in Claims 1-12 and the specification as originally filed. No new matter is believed to have been added by these amendments.

The present invention provides a method for producing a purine nucleoside by fermentation in which a microorganism is cultured in a medium to produce and accumulate the purine nucleoside where the microorganism is of the genus *Escherichia* and has acquired a purine nucleoside producing ability due to an increase in enzyme activity involved in purine nucleoside biosynthesis.

The increase in enzyme activity involved in purine nucleoside biosynthesis is described in the specification starting on page 6, lines 18. Examples are provided, which include enhancing the regulatory region of the gene by, for example, mutating the promoter to increase transcription and inserting a promoter or enhancer (page 6, line 25 to page 7, line 13). The specification also describes increasing the copy number of the gene using known methods as described on page 7, lines 14-24.

The specification also describes various genes, such as purF (page 8, line 5), ADP, guaB, guaA (page 9, lines 10-17), succinyl-AMP synthase, purine nucleoside phosphorylase, adenosine deaminase, inosine-guanosine kinase, etc. (see page 12, lines 18-26 and page 16, lines 10-25; and page 21, lines 8-26). In addition, the genes involved in purine biosynthesis are in "Biosynthesis of Purine Nucleotides" in: *Escherichia coli* and *Salmonella* Cellular and Molecular Biology, Second Edition, ASM Press (Washington, D.C.), Vol. I, pp. 561-579 (copy attached).

A criteria for enablement is whether the specification describes "at least one method for making and using the claimed invention that bears a reasonable correlation to the entire

scope of the claim..." (MPEP 2164.01(b)). The disclosure provided in the specification, as briefly highlighted in the preceding paragraphs, unquestionably describes more than one method of producing a purine nucleoside by fermentation using a number of different genes and a number of different ways to increase in enzyme activity involved in purine nucleoside biosynthesis as claimed.

Therefore, Applicants request that the rejection of Claims 13-26 under 35 U.S.C. § 112, first paragraph be withdrawn.

Turning to the rejection of Claims 13-16 and 22-26 under 35 U.S.C. § 112, second paragraph, Applicants request reconsideration in light of the evidence attached hereto and the following discussion.

Applicants direct the Examiner's attention to MPEP 2173.05(g):

> A functional limitation is an attempt to define something by what it does, rather than by what it is (e.g., as evidenced by its specific structure or specific ingredients). **There is nothing inherently wrong with defining some part of an invention in functional terms. Functional language does not, in and of itself, render a claim improper**. In re Swinehart, 439 F.2d 210, 169 USPQ 226 (CCPA 1971).

> A functional limitation must be evaluated and considered, just like any other limitation of the claim, **for what it fairly conveys to a person of ordinary skill in the pertinent art in the context in which it is used**. A functional limitation is often used in association with an element, ingredient, or step of a process to define a particular capability or purpose that is served by the recited element, ingredient or step . . . It was held that the limitation used to define a radical on a chemical compound as "incapable of forming a dye with said oxidizing developing agent" although functional, was perfectly acceptable because it set definite boundaries on the patent protection sought. *In re Barr*, 444 F.2d 588, 170 USPQ 33 (CCPA 1971).

The phrase "an increase of an expression amount of a gene for an enzyme invovled in purine nucleoside biosynthesis" in Claim 13 is readily understood by one of skill in the art since the genes involved in purine biosynthesis are known (see the attached copy of "Biosynthesis of Purine Nucleotides" in: *Escherichia coli* and *Salmonella* Cellular and Molecular Biology, Second Edition, ASM Press (Washington, D.C.), Vol. I, pp. 561-579). Likewise, the phrase in Claim 14: "an increase of an expression amount of a gene for an enzyme involved in purine nucleoside biosynthesis" is also readily understood by one of skill in the art.

The phrase "deregulation of control of an enzyme involved in purine nucleoside biosynthesis" in Claim 15 is readily understood by one of skill in the art since the enzymes are known (see the attached copy of "Biosynthesis of Purine Nucleotides" cited above; and the attached copy of *J. Biol. Chem* 268:10471-10841 (1993)).

The phrase "control of the enzyme involved in the purine nucleoside biosynthesis is desensitized by desensitization of feedback inhibition" in Claim 16 is readily understood by one of skill in the art since the enzymes subject to feedback inhibition are known (see the attached copy of "Biosynthesis of Purine Nucleotides" cited above; and the attached copy of *J. Biol. Chem* 268:10471-10841 (1993)).

The phrase "derepressed by inactivation of a purine repressor" in Claim 22 is readily understood by one of skill in the art since the identity and structure of purine repressors are known (see the attached copies of "Biosynthesis of Purine Nucleotides" cited above; *J. Biol. Chem* 263, 19653-19661 (1988); *J. Bacteriol.* 174, 6207-6214 (1992); and *J. Bacteriol.* 172, 4555-4562 (1990)).

The phrase "a reaction branching from purine nucleoside biosynthesis and leading to another metabolite is blocked in the cells of the microorganism" in Claim 23 is readily understood by one of skill in the art since the reactions, enzymes and metabolites are known (see the attached copies of "Biosynthesis of Purine Nucleotides" cited above; and *Agr. Biol. Chem.* 36(9), 1511-1522 (1972)).

The phrase "enhanced by weakening the incorporation of a purine nucleoside into cells of the microorganism" in Claim 25 is readily understood by one of skill in the art since the reactions and enzymes involved in incorporating purine nucleosides into cells are known (see the attached copy of "Transport of nucleic acid precursors" in: Metabolism of Nucleotides, Nucleosides and Nucleobases in Microorganisms, Academic Press (London), pp. 259-305).

The phrase "weakened by blockage of a reaction involved in the incorporation of the purine nucleoside into cells" in Claim 26 is readily understood by one of skill in the art since the reactions and enzymes involved in incorporating purine nucleosides into cells are known (see the attached copy of "Transport of nucleic acid precursors"cited above).

Concerning the antecedent basis issues the Examiner's raises in Claims 23, 25 and 26, Applicants direct the Examiner's attention to MPEP § 2173.05(e), which states, in part:

> . . . Obviously, however, the failure to provide explicit antecedent basis for terms does not always render a claim indefinite. . . Inherent components of elements recited have antecedent basis in the recitation of the components themselves. For example, the limitation "the outer surface of said sphere" would not require an antecedent recitation that the sphere has an outer surface.

As this applies to the present claims, since the enzymes, reactions, and metabolites in various branched pathways for purine biosynthesis are known, the phrases in question are inherent components of the claims from which Claims 23, 25 and 26 depend.

Therefore, the claims are definite under the meaning of 35 U.S.C. § 112, second paragraph and as such withdrawal of this ground of rejection is requested.

Applicants submit that the present application is now in a condition for allowance. Early notification of such allowance is earnestly solicited.

Respectfully submitted,

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